

Identifying the strength of weak snowpack layers in lab and field experiments

(Studien-/ Masterarbeit)

Understanding the mechanical properties of snow is crucial to accurately predict avalanches, as it provides critical information about the stability and behavior of snowpacks in different conditions. In this project, our goal is to better understand the mechanical properties of weak snowpack layers by studying how their mechanical behavior and microstructure are related. To this end, experiments are conducted in the field and in the laboratory. Eventually, this information will be used to improve snow instability assessment for avalanche forecasting.



The research group Avalanche Formation and Dynamics at the Institute for Snow and Avalanche Research SLF in Davos, Switzerland is looking for a master student for the coming winter season (2023/2024). The project focuses on designing and optimizing an experimental setup to measure the strength of weak snowpack layers under different mixed-mode loading conditions in the field. The longer term goal is to use this setup to measure failure envelopes for various types weak snowpack layers. The work within the master project will consist of the following tasks:

- Testing and optimizing the experimental setup in the cold laboratory at SLF, Davos using artificially grown samples
- Compare laboratory measurements with those from a mixed mode displacement-controlled apparatus
- Testing and optimizing the experimental setup on real snow samples in the field (around Davos)
- Obtain a failure envelope for at least one type of weak layer

We are looking for a master student with a strong background in experimental physics/engineering and (Python) programming, who is motivated to work with cold temperatures in the cold laboratory and in the field. Experience with moving in alpine terrain is recommended.

The project is part of a collaboration of the Chair of Lightweight Design with



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